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Forestry Research West

April 1999

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A report for land managers on recent developments in forestry research at the three western Experiment Stations of the Forest Service, U.S. Department of Agriculture.

Forestry Research West

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Cover

While wilderness is viewed differently in different parts of the world, the preservation of wilderness was a common theme expressed by scientists and resource managers attending last fall's Sixth World Congress in Bangalore, India. Read about the Congress and perspectives from scientists who attended, beginning on page 11.

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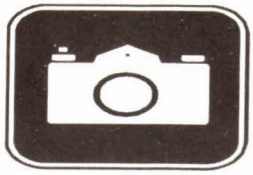
Monitoring Riparian Meadows Using Time-Lapse Photography



A review
by Rick Fletcher
Rocky Mountain Research Station

Riparian areas are key ecosystems in most western landscapes, often the center of a multitude of natural and human activities, such as grazing, recreation, and wildlife habitat. These uses, however, can open the door to potential conflicts. The kinds and amounts of activities occurring on these sites are often in dispute as many riparian areas are remote or have limited seasonal access, limiting monitoring. Impacts by wild ungulates, domestic livestock, or recreationists can result in relatively similar damages to streamside environments. As a result, competing interests often blame others for perceived resource damage. Such issues can become serious management concerns.

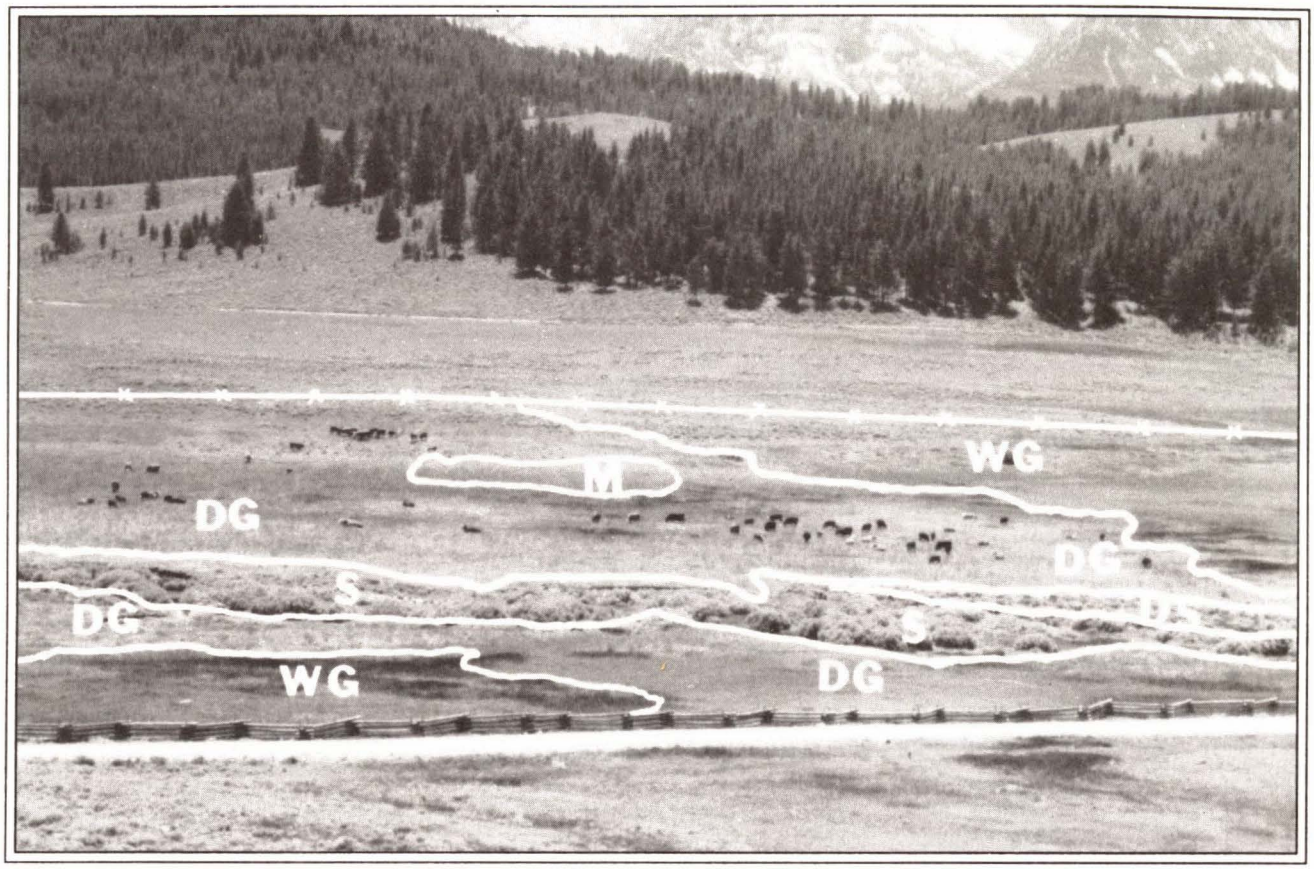
To help guide management decisions for riparian areas, scientists with the Rocky Mountain Research Station conducted a study using time-lapse photography to document riparian use. Project Leader Warren Clary says, "if a riparian area has the appearance of deteriorating conditions, the cause must be determined if managers are to address the problem." With camera gear in tow, they headed to the Sawtooth National Forest in Idaho.

A Visit to Stanley Creek

In this study, scientists wanted to know where cattle were spending their time on a meadow, what their apparent activity was, and if interpretations from these observations correlated with ground measures of grazing effects. The study, part of a controlled grazing experiment, was conducted along Stanley Creek in the Sawtooth National Recreation Area. "We used time-lapse photography to document the positions of cattle within several pastures," said Clary. "A total of 10 to 23 days of picture sequences were obtained per pasture. Photographs were taken using a 35-mm single lens reflex (SLR) camera with a motor drive and a 250-exposure magazine back controlled by an intervalometer (a timing device that advances the film)."

Scientists positioned the camera in a protective case on a hill slope approximately 12 to 30m above the meadow level. Clary points out that an elevated camera position is critical if you want to document animal distribution. If merely the presence of animals is all you are looking for, then a fence post or similar location will do. Photographs were taken at 20-minute intervals during daylight hours. Each animal was classified for location on broad plant community/soil groups: streamside, wet graminoid, dry graminoid, dry shrub, and mixed types. The activity of each animal was classified into either: standing with head down, standing with head up, or laying down. Cattle locations were expressed as number per unit area or density. Analysis of variance was conducted using a General Linear Model PC software package.

"Time-lapse photography showed a readily apparent difference in the distribution of cattle among site categories," said Clary. "The cattle were concentrated within the dry graminoid area composed mainly of the tufted hairgrass



Scientists used time-lapse photography to study the concentration of cattle on the dry graminoid (DG), dry shrub (DS), wet graminoid (WG), mixed types (M), and streamside (S) portions of this meadow.

community type with substantial elements of the Kentucky bluegrass community and the thickstem aster-Idaho fescue community. The high animal density on these sites was apparently in part because they were resting and ruminating more on dry graminoid sites," he said. Clary believes the wet graminoid, streamside, and mixed types likely had a lower animal presence because of the higher soil moisture contents of these sites, some of which were quite boggy. Once on the dry graminoid area, Clary believes the cattle likely invested more grazing time because the rate of forage intake would be low on the dry, tufted hairgrass sites where leaf heights are very short.

Clary says that measures typically used in range management would not have determined that the cattle were spending such a high proportion of time on one site compared to the others. "Additional animal time on any site has the potential of increased damage through trampling of forage plants, soil compaction, and woody plant structural

breakage," he said. "Thus, better interpretation of grazing effects are possible with the additional information provided by time-lapse photography."

A Look at Equipment

Costs of equipment used in time-lapse photography vary considerably, depending upon the requirements and desire of the user. Figure 1 represents: A) costs for equipment used in this study, and B) costs for a more economical set-up. A drawback with the economical set-up is the limited film capacity of 36 exposures, although there may not be a need to record images as often as the study example presented (every 20 daylight minutes). A 36-exposure roll of film would last 1 week if the intervalometer were set to take one photo every 3 daylight hours during long spring days, or about every 2.5 daylight hours during shorter fall days, if general use of the area was the primary interest.

Clary points out that early documentation utilized relatively economical Super 8-mm movie cameras, but they have largely been replaced with video camera imaging. Video camcorders have a potential advantage because a high number of sequences can be recorded. For instance, about 1,400 5-second sequences could be recorded on a 2-hour tape. This is compared to 36 to 250 frames using the 35-mm set-up. A good quality 4-head VCR and television set are necessary for clear viewing of paused frames, (although some of the newer camcorders have the ability to view individual frames sans VCR). Equipment and costs for a video camera with a LANC jack and a LANC video controller are detailed in Figure 2 (next page).

Figure 1

(A)

Camera (35mm with 28-85 mm Lens)	$1,550
Motor Drive	250
Magazine Back (250-exposure)	1,312
Cassettes (2) for Magazine Back	105
Intervalometer (Telonics, Phoenix, AZ)	450
Ammo Box (20mm with glass covered hole for viewing)	----
TOTAL	$3,667

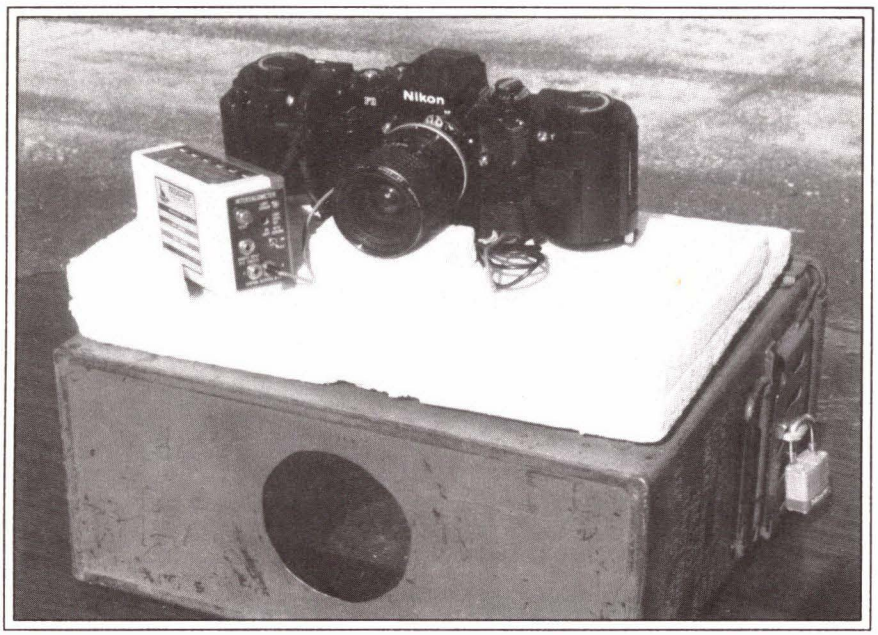
(B)

Camera (35mm with Build-In Motor Drive, 35-80 mm lens, and 36-exposure capacity)	$600
Intervalometer (Telonics, Phoenix, AZ)	450
Ammo Box (20mm with glass covered hole for viewing	----
TOTAL	$1,050

Telephoto Lens for Above Cameras (if necessary) $300

Figure 2

Video Camcorder With LANC Jack.....$700-1,000
LANC Video Controller
(MK Enterprises, Blackstone, VA).....400
Ammo Box (20mm with glass covered hole for viewing)....----
TOTAL $1,100-1,400



Camera set-up used in the study had a 28-85 mm zoom lens, motor drive, 250-exposure magazine back, and intervalometer. When mounted for use, the camera is inserted through the back (originally the lid) of the modified ammo box such that the camera lens and the light sensor of the intervalometer have access to the glass window. The box is then closed and sealed.

If you would like additional information on this study and the use of time-lapse photography to record riparian use, order Research Note RMRS-5, *Time-Lapse Photography to Monitor Riparian Meadow Use*, by John W. Kinney and Warren P. Clary. It is available from the Rocky Mountain Research Station (see ordering cards near the back of this issue.) Warren Clary can be contacted at (208) 373-4381; E-mail: wclary/rmrs@fs.fed.us.

Bracken Fern Harvesting

By Deborah Chavez and Connie Gill, Pacific Southwest Research Station

Bracken fern for dinner anyone? It may not be for everyone, but many Asian-Americans are fond of it. During a six-week period, beginning in April pickers travel, some of them long distances, to gather this fern in the wild.

Bracken fern (*Pteridium aquilinum*) grows in abundance on parts of the Arrowhead Ranger District of the San Bernardino National Forest (SBNF). Under a special forest products permit program, many Asian-Americans pick the young bracken fern fiddleheads for use in holiday and everyday meals.

In early 1996, the Forest Service initiated a project to identify background and behavioral characteristics of the SBNF fern gatherers, identify motives for collecting ferns, and make specific management recommendations for protecting the quality and diversity of the resources and the activity—while maximizing compliance with fern program regulations. To accomplish these goals, related literature was analyzed, in-depth interviews were held with key informants who had knowledge of the culture and the fern gathering activity, interviews were held with SBNF and SBNF Association (SBNFA) employees, on-site observation was made during the fern picking season, and there was a brief formal mail survey.

Example of a fairly young fiddlehead.

Previous Research

Bracken fern grows throughout the world, occurring almost everywhere with the exception of hot and cold deserts. In fact it may be the single most widespread vascular plant in the world. Bracken fern occurs in every U.S. State and Canadian province as well as Mexico, and is considered a single worldwide species. Two subspecies are recognized: *aquilinum* in the Northern Hemisphere, and *caudatum* in the Southern Hemisphere.

Most of the fern's regeneration is vegetative. Spore generation appears to require soil sterilized by fire. The fern is so tough that even after fire its rhizomes survive and produce new growth. Through its hardy, aggressive rhizome system the plant reproduces vegetatively and stores water for the plant's needs. Today, some live rhizomatous clones are over 1,000 years old. Bracken fern is a survivor. Resistant to most herbicides—a fact well known to foresters who attempt to reduce bracken fern competition with conifer crops—bracken fern is a survivor.

Surprising as it may seem with humans eating it, the bracken fern stems and leaves—including fiddleheads—are poisonous to both wildlife and livestock, as well as to human beings. The poisonous effects are cumulative. Cattle must eat an amount equal to their body weight over a one-to four-month period to be fatal.

For humans, there are two carcinogens found in bracken fern's leaves, including fiddleheads, and leaf stalks—one of which imitates the effects of radiation poisoning. Plants may also produce cyanide. In Japan where fern fiddleheads are part of the traditional diet, scientists attribute the high incidence of stomach cancer to its consumption. During the study, it was found that some of the pickers know this information but, in general, seem to disbelieve or choose to ignore the findings. It was reported that some young men refuse to eat the ferns because they believe it causes male impotence, but there was no literature to support this concern.

Background

In the 1970s, Southeast Asians began moving into southern California. During the late 1970s and early 1980s, this group became a visible visitor segment on the Arrowhead Ranger District on the SBNF. In the spring of 1981, District staff first noticed heavy harvesting of the new, tightly coiled fiddlehead fronds of the bracken fern.

At times, the pickers created conflicts by wandering onto adjacent private lands. It was reported that one landowner produced a gun to force fern pickers off his land, and in another instance, a fistfight nearly broke out as a result of fern picking on private land.

In 1981, in an effort to avoid conflicts, and after determining that the bracken fern was a forest product rather than a recreational activity, a minimal fee for gathering the fern was instituted by the District and it began to sell permits. A more recent concern has been the danger fern picking might have on the southern rubber boa snake (listed by the state of California as a threatened species) and its habitat. Picking areas were marked to protect the snake and limit the pickers to Forest Service sites.

In 1993, the fern operation was taken over by the SBNFA and the program was reorganized. Now, the SBNFA purchases the ferns from the Forest Service at $.10 per pound, then retails to the public via a permit system at $.50 per pound.

A permit fee of $20 allowed visitors to gather up to 40 pounds of bracken ferns. The ferns had to be picked on the day the permit was purchased and had to be placed in one of two color-coded bags issued by the Ranger District. The coded bags are the only approved picking receptacles.

In the beginning of the study, it was suspected that a considerable amount of fern gathering was done for commercial purposes, but it was determined after interviews with some of the pickers that this was not so. A minimal amount was picked for sale and only a few interviewees said they had ever purchased the already harvested fern from others.

Uses of the Fern

Bracken fern is used for many purposes: basket making material, dyes, astringent, potash for glass making, soap, animal bedding, mulch, thatch, medicine, and especially for food. *Pteridium aquilinum* is used in non-industrialized cultures worldwide as well as in some industrial societies, including Japan and Korea. Japanese are probably the world's largest consumers of the fern. Bracken fern is grown commercially as a food and as an herbal remedy in Canada, the U.S., Siberia, China, Japan, Brazil, and perhaps in other countries as well.

Culture and Fern Gathering Activity

At first, forest managers thought the bracken fern gatherers were of Korean decent. However, the study revealed that 13 percent were Japanese and 4 percent were other ethnicities.

Picking, or "catching" ferns is primarily a middle and older generation activity. Those in the middle generation often participate because they live with or have close relationships with their parents. Few of the younger generation have grown up picking or eating ferns, so many have little interest in participating. Often younger Korean-Americans find the unfamiliar taste of the ferns unappealing. Among the fern gatherers, many appeared to be family groups, with relatively few children. Some groups consisted of several older women brought by a male driver who waited while the women gathered the ferns.

The main reason for gathering bracken fern is for eating. One interviewee stressed the extremely high price to buy ferns in Korea and the difficulty of gathering bracken ferns because the Korean mountainsides are steep, the undergrowth dense, and the ferns sparse. Koreans, especially older ones, enjoy picking bracken ferns in America because they grow in such abundance. Many of the pickers talked about the mountains reminding them of home.

Mature bracken fern.

There is no religious significance associated with picking or eating the ferns for Koreans. However, the vegetarian Buddhist monks have a history of eating "mountain vegetables," including ferns. Buddhists believe that every mountain has a god. If you eat or drink while on the mountain (while picking ferns, for example), you should serve the god first by sprinkling the beverage and scattering a bit of food on the ground. This shows appreciation to the gods "for what they are providing for you." Some of the pickers on the Arrowhead Ranger District may leave food offerings while gathering ferns.

The most frequent gatherers of bracken fern are older people, many of whom previously lived in Korea. For these individuals, ferns offer not only a familiar foodstuff, but also a potent symbol of cultural heritage and values, homeland, and past experiences. Processing, preparing, and eating the ferns, as well as the fern gathering activity itself, offer many older visitors a remembrance of their rural pasts.

Reasons given for gathering ferns in descending order: to spend time in the mountains, share ferns with family or friends in the U.S., use ferns in holiday meals, use ferns in everyday (non-holiday) meals, to teach children or others about your cultural background, share ferns with family or friends in other countries, use ferns for decoration or display, sell ferns to others, picnicking, nostalgia for ethnic background (remember country living in Korea), spend quality time with family members, meat substitute for hypertension patients, learn how to grow ferns, like ferns, and ferns taste good. Also high on the list was, "to teach children or others about my cultural background." Medicinal use was listed by only one person.

Results of the survey indicate that Korean and Japanese respondents enjoyed both the social and environmental elements of the fern gathering experience, but cultural heritage factors were even more important for the Koreans. One survey respondent jotted a note on the survey postcard to say, "My parents-in-law want to go and pick it [to] remember their old days. They don't even eat the fern. We will not go and pick after they pass away. We just go for them."

Harvesting and Preparing the Ferns

To pick the spring shoots, or fiddleheads, the stem is grasped between finger and thumb roughly four inches above the ground—for a stem approximately 10 inches long. Other pickers indicate that the shoots should be picked about one inch from the ground when the stems are approximately six inches high. The stem is then snapped off crisply, leaving the picker with the stem and coiled frond of the young shoots. Some pickers expressed the belief that leaving a portion of the growing stem behind is necessary to ensure growth and regrowth. During site visits, many examples of stems branching out with new growth after the original fiddlehead had been picked were observed.

Among Korean-Americans, processing is required to render the young shoots ready for cooking. The shoots are briefly boiled for about 30 seconds in plain water, then spread on cloth or boards and placed in the sun to dry. When completely dry, the ferns are stored in airtight containers, where they can be kept indefinitely for future use. Some pickers believe the leaves are not healthy to eat. To eliminate them, the dried stems are rolled between palms of the hands until the fiddleheads fall off. In the processed and dried state, bracken ferns are commercially available in the Korean markets of Los Angeles; in 1995, the price was about $8 per pound.

Before cooking, the dried ferns are soaked in water for approximately five hours or boiled for two to three hours. The rehydrated ferns are used in soups—especially Korean holiday soups—or stir-fried in sesame oil with sesame seeds, salt, and pepper. Ferns are often included in holiday meals for the New Year's Day (January 1), Chinese New Year (Koreans use the Chinese calendar), the Hard Moon Festival (August 15th), and the Bigger Moon Festival (a harvest festival in late fall). Some Korean-Americans serve fern dishes only on holidays, while others use them in everyday cooking.

One experienced Japanese picker indicated that she most commonly ate fresh, newly picked ferns and considered them a seasonal dish, eaten primarily when available for picking. She used them in soups, salad, as decoration served beside another dish, or dipped into a sauce. She also reported that ferns may be eaten either fresh or cooked.

Customer Service Activities to Aid Fern Gatherers

With the majority of pickers being Korean and not speaking or reading English, signs, handouts, instructions, and posters were printed in Korean. Fern season opening is also announced in a Korean newspaper. Korean-American volunteers or employees were sought to help out during the harvest period.

Out of concern for the customers, one Association staffer works hard to make the pickers feel as welcome as possible by first bowing to the oldest member of the picking party. This individual daily picks a bouquet of fresh ferns to decorate the information desk and has also made suggestions such as posting a "welcome" sign in front of the Ranger District office in both Korean and English. The positive responses achieved through this open-minded approach suggest that public service training and multicultural training for all staff might strengthen the fern program.

Law enforcement efforts are kept low key. If a picker is in the wrong area, has picked over his limit or doesn't have a permit, before citations are issued, offenders are offered the opportunity to "make it legal" by moving to an approved picking area or by purchasing permits sufficient to cover the ferns they have picked.

When available, Korean volunteers or employees are posted in the Ranger District office to interpret and to assist with explaining the program, selling permits, and offering directions. The boundaries of designated picking areas are flagged for clarity, and entrances to parking areas are similarly marked.

Conclusions

Since it has been established that a significant percentage of the pickers are Japanese, researchers have suggested information and signage also be printed in that language.

An original goal of the fern program was to reduce fern gathering on private land. This goal appears to have been met, but more research is needed to determine the extent of the problem and to suggest solutions to continuing trespass problems, if any.

One of the greatest strengths of the program is the SBNF Association employee. Through experience she has learned many approaches and techniques for working positively with the District's culturally diverse audience. Any training she can provide to other Forest and Association employees who come into contact with the fern program would be extremely beneficial.

Adding an explanatory note to no-picking messages may increase compliance for the pickers and decrease conflicts with private landowners and Forest Service personnel. For example, the program brochure might state, "Please pick in designated areas only. Most land along the highway is private property."

As processed ferns are readily available for purchase in Los Angeles, indications are that people are picking bracken ferns for more than monetary reasons alone. Thus, the forest Service would be wise to recognize that for many if not most participants, the issuing of fern permits in effect licenses the practice of cultural traditions that are of great significance to the visitors.

"The fern gathering program primarily serves Asian populations of southern California, who consider the young fronds a delicacy. For many of these people, introduction to the National Forest is through fern-gathering. Otherwise, they might never have the opportunity to learn wildland ethics or to participate in the heritage of public land stewardship common to all citizens. The picking of the plant is more than just a harvest. It is a family outing and a cultural experience which allows the participants to remember a homeland thousands of miles away, a heritage of deep value to them. The San Bernardino National Forest is proud of the multicultural diversity of its forest visitors, and is committed to encouraging non-traditional users to explore and enjoy the forest." (Arrowhead Ranger District, San Bernardino National Forest, n.d.)

Global Wilderness Congress:

Wilderness with a Small "w", but Synergy with a Large "S"

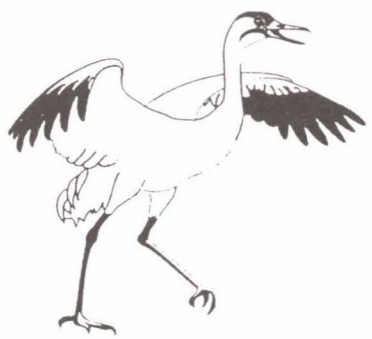
By Dave Tippets,
Rocky Mountain
Research Station

Scientists from around the world converged on Bangalore, India, last October for a wilderness congress. The scientists gathered on common ground with energy and enthusiasm. Although wilderness means different things in different parts of the world, they all valued wilderness preservation.

Participants at the congress explored many issues, but science and conservation of biodiversity attracted the most interest. Alan Watson, of the Leopold Wilderness Research Institute in Missoula, Montana, and Greg Aplet, of The Wilderness Society, organized a science symposium for the congress.

"Wilderness, in the broadest sense of the word, means nature and humans," Aldo Leopold Wilderness Research Institute Director David Parsons said recently, relating the global perspective he witnessed at the Sixth World Wilderness Congress. "Our vision of wilderness is not replicated any place else in the world."

"In India itself, even a mini-sanctuary of 5 square km can contribute greatly to the country's biodiversity," Senior Lecturer of the Department of Zoology in Kerala, India, Shaju Thomas, reported at the Congress. In a country where extreme landscape modification has resulted in the extinction of many plant and animal species, Thomas' research highlights the value of India's traditonal concept of "Sacred Groves" -- wilderness on a small scale by American standards, but vital to the conservation of biodiversity in other parts of the world.



Parsons explained that in India, people associate wilderness with tiger preserves; in Africa wilderness is game parks; and in some countries wilderness is biosphere reserves. "Wherever you go looking for wilderness on our planet, nature and humans are the least common denominator -- the two things that will be in people's minds wherever you talk about wilderness," Parsons says.

The World Wilderness Congress first met in South Africa in 1977. Since then, the Congress met in Australia, Scotland, the United States, Norway, and most recently India.

"I found it humbling," Parson's said. "You have to sit down with people and learn about how they view wilderness to fully understand what we have to work with in the United States."

In addition to the differences in scale, Congress Science Symposium Co-chair Alan Watson of the Leopold Institute also reported cases of international urgency and dedication to preserving biological diversity that inspired the Forest Service participants. "It's a wonderous thing," Watson said, "to send out an invitation to scientists and managers all over the world and get an almost overwhelming interest in participation from every continent."

Following the call for papers, Watson and his co-chair Greg Aplet, Forest Ecologist for the Wilderness Society, started seeing lots of papers with authors last names like Solomonov, Rybolov, Rossolimo, and Germongenov -- scientists from the former Soviet Union urgently struggling to publish their research in the turbulence following the fall of the Soviet Union.

"There is a threat to the remaining infrastructure for science and the protection of natural areas," Watson said. "These scientists felt the urgency to present their research in an international forum to establish some internal credibility with whatever organization they worked."

"Then their economy collapsed last Spring," Watson explained. Entire research institutes were closed overnight. Many of the Russian scientists have not been paid very well for doing research for years, and are now forced to work at other jobs to survive and continue their research. As a result, even though their papers were accepted, none of the Russian scientists were able to attend the Congress in India.

The Russian's papers are included in Volume 1 of the Proceedings, which was published in the fall of 1998. Volume 2 of the Proceedings is scheduled to be released by September 1999. The second volume will contain the rest of the papers contributed by scientists who were fortunate enough to attend and personally present their papers. Although the Russian scientists' papers are published, Watson laments that he doesn't know what was lost to the discussion because they weren't in India to participate. As it was, the international Congress produced a synergy of unplanned results and benefits. Several central themes emerged and, with them, ideas and suggestions for solving problems that cross political boundaries.

"Conservation of biodiversity, not recreation," Watson reported, "drives the global effort to preserve wilderness. In the global wilderness community there is a true interdisciplinary approach -- not a simple recreation perspective of wilderness," he explained.

"No matter where conservationists work to preserve wilderness, they quite often identify some of the same threats to wilderness protection," Watson recalled. In the past, local people have been seen as the greatest threat to wilderness protection in many places. Luckily, around the world, conservationists have come to realize the value of community-based conservation programs.

"Local people living in or near wilderness," Watson said, "have sometimes seen wilderness protection as an attempt by outside people to impose their values on the local community." Around the world, conservationists are now realizing the importance of protecting wilderness with community-based participation.

"The World Wilderness Congress offers the people of the world a concept of wilderness that is bigger than local political conflicts," Watson continued, as he reported his experiences from the conference.

Waterton-Glacier Peace Park is an example of how solutions can be found to preserve wilderness that crosses international boundaries. This Park on the border of Canada and the United States was created by the influence of Rotary International. Yet, that model of international cooperation has not been widely replicated.

"As a group of us discussed how wilderness had been preserved on the frontier of South Africa," Watson recalled, " we realized that the role Rotary International played in Waterton-Glacier could succeed in many other parts of the world. Non-government groups of people sharing common values can work across boundaries for the common good of both countries." It's a simple idea, but one that could be the key to preserving biodiversity and

maintaining peace on the border between Pakistan and India, and in many other parts of the world."

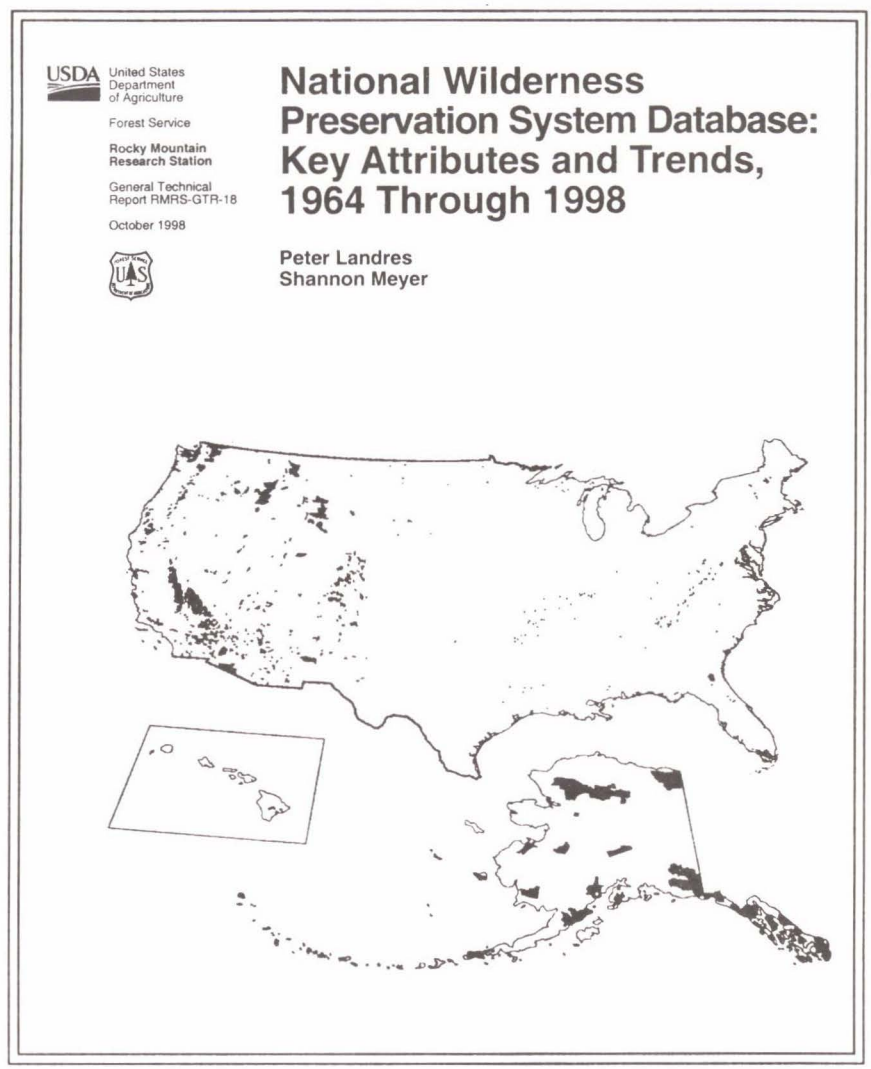
"Ideas emerged during the Congress," Watson reports, "that probably never would have popped up inside the walls of the Leopold Institute back home in Missoula." For example, there is a new frontier of wilderness preservation to be explored on the high seas and deep in the oceans. While many scientists have long suspected that biodiversity is in decline in many locations in the world's oceans, the concept of international cooperation to preserve wilderness in international waters is a new concept that began to grow at the World Wilderness Congress in India.

The many ideas captured in the proceedings can be obtained by requesting, *Personal, Societal, and Ecological Values of Wilderness: Sixth World Congress Proceedings on Research, Management, and Allocation, Volume 1*, Proceedings RMRS-4. Copies are available from the Rocky Mountain Research Station. Supplies are limited.

New From Research

Wilderness Database

The Wilderness Act of 1964 established a National Wilderness Preservation System. This new publication is a compilation of selected information about every wilderness within this system, including: legally correct wilderness name; public law that established the wilderness; date the enabling law was signed by the President; acreage designated; modifying public law or laws that affected the name, boundary, or administration; current total acreage; administering unit or units; and location. This information is also available on the World wide Web at: http://www.wilderness.net/nwps in a relational database that can be queried. Based on the data, various trends in wilderness from 1964 to 1998 are described, including the total number of wilderness, acres of wilderness, agency administration, size of individual wildernesses, and State distribution. An appendix of all public laws establishing or modifying wilderness is also included. For a copy, write the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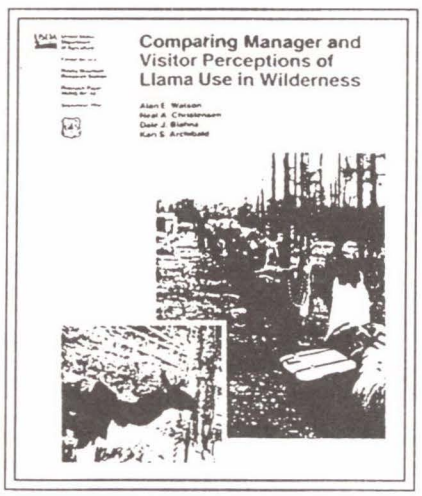
Rocky Mountain Research Station
General Technical Report RMRS-GTR-18
October 1998
National Wilderness Preservation System Database: Key Attributes and Trends, 1964 Through 1998
Peter Landres
Shannon Meyer

Rocky Mountain Research Station and request, *National Wilderness Preservation System Database: Key Attributes and Trends, 1964 through 1998*, General Technical Report RMRS-18. Supplies are limited.

Perceptions of Llama Use in Wilderness

Llama use in wilderness and backcountry in the United States is increasing. While the greatest concerns about this increase in use are unexpected impacts to native flora, native fauna, and conflicts with other user types, there is also concern about how prepared managers are to meet this increasing recreation demand. To learn more about the perceptions of llama use in wilderness areas,



scientists with the Rocky Mountain Research Station have surveyed hikers and horseback riders, commercial llama customers, and Forest Service wilderness managers. Their findings are presented in a new report, *Comparing Manager and Visitor Perceptions of Llama Use in Wilderness*, Research Paper RMRS-10. Quite often, llama users and horseback riders expressed opinions representing opposite ends of a spectrum, with managers typically somewhere in the middle, but closer to horse rider attitudes. In light of managers' expectations that all packstock use will continue to increase over the next 5 years, this assessment of differences in attitudes will help in understanding current positions regarding impacts of llama use in wilderness. Copies of the report are available from the Rocky Mountain Research Station, while supplies last.

The Starkey Habitat Database Construction

The Starkey Project, a large-scale, multidisciplinary research venture, began in 1987 on the Starkey Experimental Forest and Range in northeast Oregon. Researchers are studying the effects of forest management on interactions and habitat use of mule deer, elk, and cattle. A habitat database was compiled, using GIS (geographic information systems), to examine relations of environmental variables to ungulate distribution and habitat use. The database contains over 100 variables associated with vegetation, water, soils, roads, topography, and structural features such as fences. To learn more, request, *The Starkey Habitat Database for Ungulate Research: Construction, Documentation, and Use*, General Technical Report PNW-430, from the Pacific Northwest Research Station. Supplies are limited.

Silviculture Objectives in the Douglas-fir Region

Silvicultural knowledge and practice have been evolving in the Pacific Northwest for almost a century. Most research and management activities to date have focused on methods to regenerate older, naturally established forests after a fire, and the growth and management of young stands. This publication focuses on the historical development of silviculture in the Pacific Northwest and reviews the silvicultural practices currently available to forest managers.

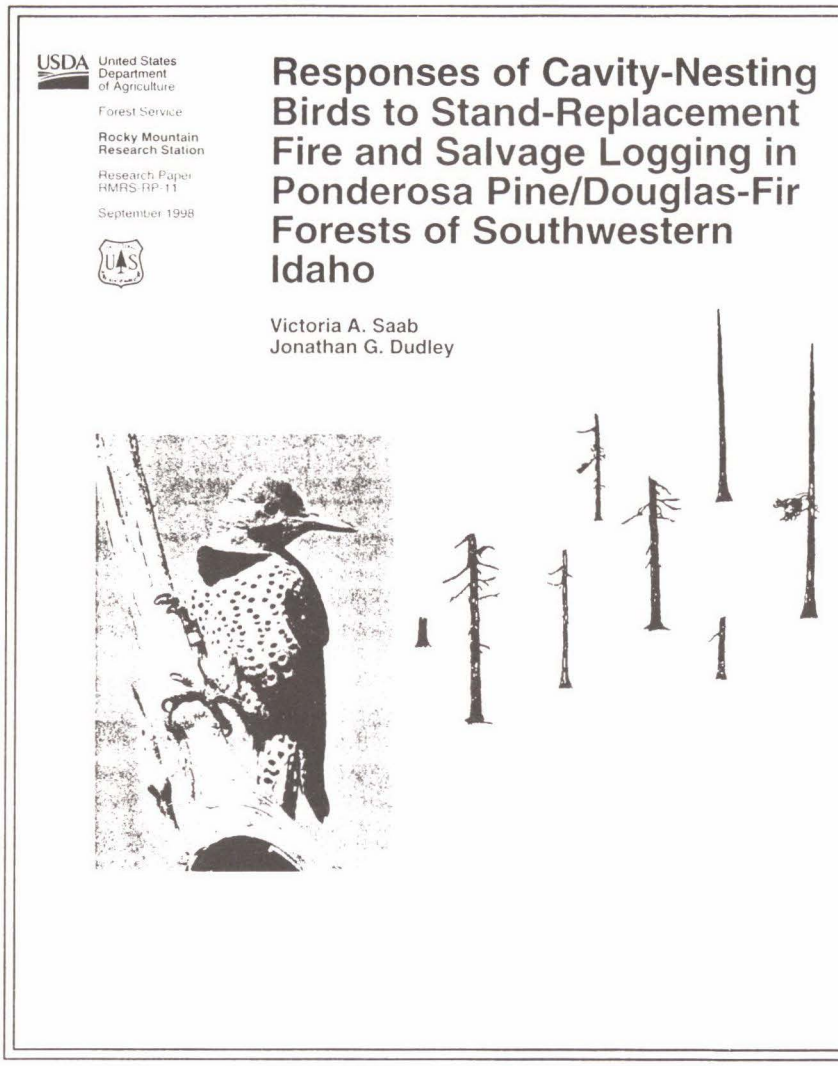
This publication then shows how these practices can be modified and used to maintain and produce wildlife habitat, diverse stand structures and pleasing scenery, while also producing wood products. Most of the silvicultural knowledge needed to design and implement regimes for integrated production of these multiple values already exists. Request, *Silviculture for Multiple Objectives in the Douglas-fir Region*, General Technical Report PNW-435, from the Pacific Northwest Research Station. Supplies are limited.

Examing the Integration of Science and Policy

Relations between science and policy concerning many issues have been changing worldwide. Public pressure to resolve such complex and often controversial issues has resulted in policymakers and policy implementers seeking better knowledge on which to base their decisions. As a result, scientists have become more actively engaged in the creation and evaluation of policy. This publication examines how Canada, Mexico, and the United States approach the integration of science and policy. Request, *Integrating Science and Policy in Natural Resource Management: Lessons and Opportunities from North America*, General Technical Report PNW-441, from the Pacific Northwest Research Station. Supplies are limited.

Responses of Cavity-Nesters to Fire and Logging

In 1994, scientists with the Intermountain Research Station (now Rocky Mountain Research Station), along with the Boise National Forest (Idaho), initiated long-term studies on bird responses to different fire conditions in ponderosa pine/Douglas-fir forests of southwestern Idaho. A new report details their findings, along with management implications of post-fire salvage logging for cavity-nesting birds. For a copy of the report, request *Responses of Cavity-Nesting Birds to Stand-Replacement Fire and Salvage Logging in Ponderosa Pine/Douglas-fir Forests of Southwestern Idaho*, Research Paper RMRS-11, from the Rocky Mountain Research Station. Supplies are limited.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Rocky Mountain Research Station
Research Paper RMRS-RP-11
September 1998
Responses of Cavity-Nesting Birds to Stand-Replacement Fire and Salvage Logging in Ponderosa Pine/Douglas-Fir Forests of Southwestern Idaho
Victoria A. Saab
Jonathan G. Dudley

Pine Beetle Populations and Partial Cuts: Which Tree to Cut?

Foresters should mark weakened diseased trees when laying out partial cuts, researchers confirmed in a South-Central Wyoming study, if the objective is to prevent mountain pine beetle epidemics.

The research supported earlier findings in a Utah study showing that agents such as Armilaria root disease and comandra blister rust stimulate the production of volatile compounds. Endemic beetle populations located in those trees suggest that beetles may select those trees because increased resin flow and volatiles attract the beetles.

The management implications are that when designing partial cuts in lodgepole pine, harvesting the disease-infected trees will most effectively deal with the endemic mountain pine beetle infestation. Such knowledge may be particularly valuable when managing high value stands around campgrounds, homes, and other places where it is a high priority to maintain lodgepole pine on the site.

Characteristics of Endemic-Level Mountain Pine Beetle Populations in South-Central Wyoming, Research Paper RMRS-13, is available from the Rocky Mountain Research Station while supplies last.

For Peats Sake and for Science

Peatlands make up a very small percentage of the land area in the Northern Rocky Mountains, but contribute a disproportional share of the region's biological diversity. Peatlands have additional scientific value -- they are repositories of pollen and ash deposited there Centuries earlier -- leaving us with valuable insights into postglacial vegetation and climate.

This new publication includes a map and inventory of important peatlands in the Northern Rockies. It provides good descriptions and explanations of how they are formed, and describes the different types of peatlands. The publication includes an inventory of vascular plants that have been identified in these areas. There is also a general description of the types of invertebrates associated with these wetlands.

Peatlands on National Forests of the Northern Rocky Mountains: Ecology and Conservation, General Technical Report RMRS-11, is available from the Rocky Mountain Research Station. Supplies are limited.

To order any of the publications listed in this issue of Forestry Research West, use the order cards below. All cards require postage. Please remember to use your Zip Code on the return address.

Please send the following Pacific Northwest Station publications: (Circle the number)

1) *The Starkey Habitat Database for Ungulate Research,* General Technical Report PNW-430.

2) *Silviculture for Multiple Objectives in the Douglas-fir Region,* General Technical Report PNW-435.

3) *Integrating Science and Policy in Natural Resource Management*, General Technical Report PNW-441.

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1) *Time-Lapse Photography to Monitor Riparian Meadow Use,* Research Note RMRS-5.

2) *National Wilderness Preservation System Database,* General Technical Report RMRS-18.

3) *Comparing Manager and Visitor Perceptions of Llama Use in Wilderness,* Research Paper RMRS-10.

4) *Responses of Cavity-Nesting Birds to Stand-Replacement Fire and Salvage Logging...,* Research Paper RMRS-11.

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1) *Personal, Societal, and Ecological Values of Wilderness,* Proceedings RMRS-4.

2) *Characteristics of Endemic-Level Mountain Pine Beetle Populations in South-Central WY,* Research Paper RMRS-13.

3) *Peatlands on National Forests of the Northern Rocky Mountains,* General Technical Report RMRS-11.

4) *Cross Border Waters: Fragile Treasures for the 21st Century,* Proceedings RMRS-5.

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